

REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested.

Claims 1-15 are in the case.

Claims 12-15 stand withdrawn from further consideration as not reading on the elected invention. It is requested that upon allowance of the elected claims, these method claims be rejoined and also be allowed, consistent with M.P.E.P. § 821.04.

Claims 1-11 are the elected claims. Of these claims, 1-5 and 7-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over WO98/50480 in view of JP 09-194811 and Expancel.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the above cited references, further in view of Bernard et al.

These rejections are traversed. Specifically, the invention relates to a laminate comprising a peelable top layer, a substrate, and a bonding layer between said top layer and said substrate, wherein at least one of said substrate and said top layer is porous and an adhesive for forming said bonding layer comprises the following components:

(A) an aqueous dispersion containing a polymer, which has properties that a dried film of said aqueous dispersion has a tensile strength of 1 to 28 MPa and a percentage elongation of 100 to 2000%; and

(B) a water-based adhesive composition comprising microspheres with thermal expansion capability, each of which comprises a polymer shell encapsulating a gas, whereby, when said laminate is heated, said microspheres increase in volume facilitating peeling of said top layer from said substrate.

Such laminate provided with a peelable top layer can be used as building materials that have the capability of surviving severe use conditions, and can be easily recycled after use.

In rejecting the claims over the cited art, the Examiner concedes that WO '480 lacks an explicit teaching of at least three specifically claimed features, i.e.,

- a. The claimed elongation value, as well as tensile strength of the adhesive;
- b. The use of an ethylene vinyl acetate copolymer with an anionic polyurethane dispersion, and
- c. The use of expandable, gas-filled microspheres with the defined expanding magnification values and expanding start temperature.

He thus relies on the secondary art as assertedly making obvious the claimed invention.

It is submitted that, even if the secondary references are combined with WO '480, such combination does not establish obviousness of Applicants' discovery, these references also not being properly combinable with WO '480.

Specifically, with regard to the claimed elongation value of the adhesive, not disclosed by WO '480, as well as the claimed tensile strength of the adhesive, these claimed values do not define only optimum values of a result-effective variable ascertainable by routine skill in the art, as asserted by the Examiner. In fact, unobvious result-effectiveness is present due to these claimed limitations, rebutting any possible *prima facie* case obviousness.

Note *In re Antonie*, 195 USPQ 6.

Thus, as so demonstrated by Comparative Examples 3 and 4 and Table 1 at page 36 of the specification, reproduced below, if the tensile strength or the percentage elongation of the adhesive is not within the claimed range, peeling of the metal top layer is poor as compared to the results of Examples 6-11, according to the invention. Such result-effectiveness manifestly cannot be considered as being optimum within the skill of the routineer in this art, but, contrariwise, could not have been foreseen and represents indicia of unobviousness.

As described in the page 6 of the present specification, the claimed ranges of the tensile strength and the elongation value are determined to maintain a sufficient bonding strength under severe use conditions of the laminate, and allow the microspheres to maximally exhibit expansion performance at the time of removing the top layer from the laminate. That is, when the tensile strength is less than 1 MPa, and/or the percentage elongation is more than 2000%, it becomes difficult to maintain sufficient bonding performance in the laminate. On the other hand, when the tensile strength is more than 28 MPa, and/or the percentage elongation is less than 100%, they lead to a reduction in expansion performance of the microspheres in the bonding layer. Thus, the dramatic increase in volume of the microspheres obtained by heating easily removes the top layer from the laminate is not taught or suggested by the cited references. The claimed ranges of tensile strength and percentage elongation determined according to the invention are entirely different from the ranges simply determined depending on the desired end product and parameters of the system.

Table 2

		EXAMPLE					COMPARATIVE EXAMPLE		
		6	7	8	9	10	11	3	4
Ethylene-Vinyl Acetate Copolymer (EVAc) Emulsion (parts by weight)	SF400	100	100	---	---	85	---	---	---
	OM4000	---	---	100	---	---	---	---	---
	EVA(1)	---	---	---	100	---	90	---	---
	OM3100	---	---	---	---	---	---	---	---
	SF480	---	---	---	---	---	100	---	---
	S-PU	---	---	---	---	---	---	100	---
Anionic Polyurethane Dispersion						15	10	---	---
Microspheres with Thermal-Expansion Capability (parts by weight)		EX053	30	60	30	30	30	60	60
Dried Film of EVAc Emulsion	Tensile Strength (MPa)	7.4	7.4	4.0	9.8	10.7	11.8	1.5	29.0
	Percentage Elongation (%)	520	520	1000	700	540	850	3000<	0
Bonding Strength (Room Temperature) (N/cm ²)		74	70	75	74	79	81	60	70
Bonding Strength (Wet Heat Condition) (N/cm ²)		60	57	60	65	67	75	49	64
Peeling Test (Far Infrared Irradiation)	120°C	△	△	△	△	△	△	×	xx
	150°C	◎	◎	◎	◎	◎	◎	△	xx
	180°C	◎	◎	◎	◎	◎	◎	△	xx
Peeling Test (Ultraviolet Irradiation)	150°C	◎	◎	◎	◎	◎	◎	△	xx
Peeling Test (Hot Air)	150°C x 20 min	△	△	△	△	△	△	xx	xx
	150°C x 24 hours	△	△	△	△	△	△	xx	xx

With regard to difference b also not disclosed by WO '480, the Examiner relies on JP '811 for obviousness of this claimed feature.

It is submitted that this reference is not properly combinable with WO '480 and that, even if it is combined therewith, obviousness of this claimed feature is not established thereby.

Specifically, WO '480 is restricted to and only teaches a polyepoxide as an adhesive, no other adhesive being suitable. Certainly, one skilled in the art thus would not be motivated, nor be advised, that other polymers, such as those specifically claimed, also would be suitable in the system of WO '480. As a matter of fact, the use of such other polymers would be contraindicated by this reference, no motivation for the required substitution being present.

In any event, JP '811 does not relate to a peelable laminate. As so disclosed by this reference, its adhesive compositions have sufficiently satisfactory high levels of dry and water-resistant adhesion properties, improved heat resistant creep properties, and excellent workability. It is thus not apparent why one skilled in the art would select the composition of JP '811 for a different purpose and effect, such effect being contrary to the claimed desired effect, as a substitute for a polyepoxide, such polyepoxide only being useful in WO '480. Applicants, on the other hand, have shown unobviously superior properties and results due to the use of a polymer as specifically claimed, such manifestly not being obvious. Note the results of the examples and comparative examples in Tables 1 and 3 at pages 35 and 37, respectively, reproduced below.

Table 1

		EXAMPLE					COMPARATIVE EXAMPLE	
		1	2	3	4	5	1	2
Ethylene-Vinyl Acetate Copolymer (EVAc) Emulsion (parts by weight)	SF467	100	...	...	80	...	80	...
	EVA(1)	---	100	---	---	80	...	100
	EVA(2)	---	---	100	---	---	---	---
Anionic Polyurethane Dispersion (parts by weight)	S-PU	---	---	---	20	20	20	...
Microspheres with Thermal-Expansion Capability (parts by weight)	EX053	30	20	30	40	40	40	...
Dried Film of EVAc Emulsion (parts by weight)	Tensile strength (MPa)	4. 0	9. 8	9. 5	6. 8	12. 6	6. 8	9. 8
	Percentage Elongation (%)	770	700	710	990	900	990	700
Dipping Test		△	○	△	○	○	○	○
Heat Creep Test (mm/1h)	60°C	30	20	22	0	0	0	13
	70°C	100<	100<	0	0	0	2	79
Peeling Test (Far Infrared Irradiation)	120°C	△	△	△	△	△	xx	xx
	150°C	○	○	○	○	○	xx	xx
	200°C	○	○	○	○	○	xx	xx
Peeling Test (Ultraviolet Irradiation)	150°C	○	○	○	○	○	xx	xx
Peeling Test (Hot Air)	150°C x 20 min	△	△	△	△	△	xx	xx
	150°C x 24 hours	△	△	△	△	△	xx	△

Table 3

		EXAMPLE					COMPARATIVE EXAMPLE		
		12	13	14	15	16	17	5	6
Ethylene-Vinyl Acetate Copolymer (EVAc) Emulsion (parts by weight)	SF400	100	100	...	...	85	...	...	...
	OM4000	...	...	100	...	...	...	...	...
	EVA(1)	...	...	...	100	...	90	...	...
	OM3100	...	...	...	...	...	...	...	...
	SF480	...	...	...	...	...	...	100	...
	S-PU	...	...	...	...	15	10	...	...
Anionic Polyurethane Dispersion (parts by weight)	EX053	30	60	30	30	30	30	60	60
Microspheres with Thermal-Expansion Capability (parts by weight)									
Dried Film of EVAc Emulsion	Tensile strength (MPa)	7.4	7.4	4.0	9.8	10.7	11.8	1.5	29.0
	Percentage Elongation (%)	520	520	1000	700	540	850	3000<	0
Bonding Strength (Room Temperature) (N/mm ²)		1.0	1.0	1.1	1.2	1.3	1.4	1.0	1.2
Bonding Strength (Wet Heat Condition) (N/mm ²)		0.2	0.2	0.2	0.4	0.6	0.7	0.1	0.3
Peeling Test (Far Infrared Irradiation)	150°C	◎	◎	◎	◎	◎	◎	△	× ×

With regard to difference c, above, also not so disclosed by WO '480, the following is submitted. The Examiner states that Expance teaches the use of gas-filled microspheres for the purpose of providing an adhesive with a filler comprising outstanding weight reduction to the adhesive, while also providing shock, vibration and sound absorption properties. Page 7-8. He thus argues that it assertedly would be obvious to provide such expandable microspheres in component (B) of the claimed laminate.

It is submitted that this is not a viable conclusion. As so recognized by the Examiner, WO '480 fails to teach the use of expandable, gas-filled microspheres with the claimed expanded magnification values and expanding start temperature. However, he urges that it assertedly would be obvious to modify WO '480 by including therein expandable microspheres as taught by Expance in order to provide an adhesive with a filler comprising outstanding weight reduction to the adhesive while also providing shock-vibration and sound absorbing properties.

An essential feature not recognized by the art, however, and as now so specifically recited in the claims, is that by incorporating the defined microspheres in the bonding layer, peelability of the laminate is thereby facilitated. Such manifestly is not a result-effectiveness that could have been foreseen and would be the reasons for adding such microspheres in the claimed laminate. By combining Expance with the other references, one also would only incorporate expanded microspheres, not expandable, gas-filled microspheres, as in the claimed invention. The microspheres disclosed at pages 13-20 of WO '480 are characterized only that any functional groups present on the surface of the microspheres are incapable of reacting with or dissolving in the polyepoxide resins. Such does not suggest the use of expandable microspheres in the claimed system.

Bernard et al were not at all additionally relied upon in the rejection of Claim 6 for the defined subsidiary feature manifestly does not cure the basic deficiencies of the other

references, for reasons as pointed out and discussed above. In any event, the referred to section of this patent only relates to emulsifiers, not an anionic polyurethane dispersion with sulfonate groups, as called for by this claim.

Accordingly, withdrawal of the rejection of the claims under 35 U.S.C. § 103 is requested.

It is submitted that this application is now in condition for allowance and which is solicited.

Respectfully Submitted,

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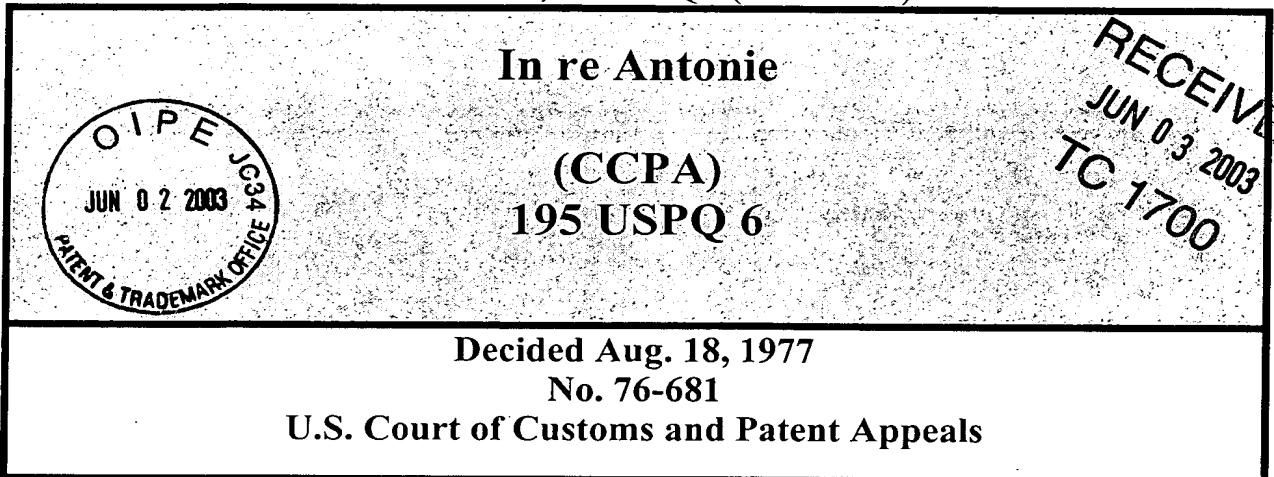
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In re Antonie, 195 USPQ 6 (CCPA 1977)



Headnotes

PATENTS

1. Patentability -- Invention -- In general (§ 51.501)

Court of Customs and Patent Appeals must first delineate invention as whole in determining whether invention as whole would have been obvious under 35 U.S.C. 103; it looks not only to subject matter that is literally recited in claim in question but also to those properties of subject matter that are inherent in subject matter and are disclosed in specification, in delineating invention as whole; just as chemical and its properties are looked to when obviousness of composition of matter claim is examined for obviousness, invention as whole, not some part of it, must be obvious under Section 103.

2. Patentability -- Invention -- In general (§ 51.501)

Controlling question in determining obviousness is simply whether differences between prior art and invention as whole are such that invention as whole would have been obvious.

3. Patentability -- Invention -- In general (§ 51.501)

Standard of 35 U.S.C. 103 is not that it would be obvious for one of ordinary skill in art to try invention; disregard for unobviousness of results of "obvious to try" experiments disregards "invention as a whole" concept of Section 103, and overemphasis on routine nature of data gathering required to arrive at applicant's discovery, after its existence became expected, overlooks last sentence of Section 103.

4. Patentability -- Change -- In general (§ 51.251)

Patentability -- Invention -- In general (§ 51.501)

Exception to rule that discovery of optimum value of variable in known process is normally obvious occurs when parameter optimized was not recognized to be result effective variable.

Particular patents -- Contactor Apparatus

Antonie, Rotating Biological Contactor Apparatus, rejection of claims 1-3 reversed.

Case History and Disposition:

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Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Ronald L. Antonie, Serial No. 331,796, filed Feb. 12, 1973. From decision rejecting claims 1-3, applicant appeals. Reversed; Miller, Judge, concurring in result; Maletz, Judge, with whom Rich, Judge, joins, dissenting with opinion.

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Attorneys:

Arthur H. Seidel, Thomas W. Ehrmann, and Quarles & Brady, all of Milwaukee, Wis., for appellant.

Joseph F. Nakamura (R. D. Edmonds, of counsel) for Commissioner of Patents and Trademarks.

Judge:

Before Markey, Chief Judge, Rich, Baldwin, and Miller, Associate Judges, and Herbert N. Maletz, * Associate Judge, United States Customs Court.

Opinion Text

Opinion By:

Baldwin, Judge.

This is an appeal from a decision of the Patent and Trademark Office (PTO) Board of Appeals (board) affirming the rejection of claims 1, 2 and 3 of an application for "Rotating Biological Contactor Apparatus" ¹ as obvious under 35 USC 103 in view of El-Naggar. ² We reverse.

The Invention

Appellant claims a wastewater treatment device in which wastewater is continuously passed through a tank. Semi-immersed contactors (disks) are continuously rotated to aerate their immersed portions and thereby to aerate both microorganisms that grow on the contactors and the wastewater itself. For this discussion, several variables are important in this device. "Throughput" is the volume of wastewater per unit time (gal./day) which the device must treat. "Contactor area" is the total area of the contactors which is exposed to the wastewater as the contactors are rotated (sq. ft.). "Tank volume" is the actual volume of liquid in the tanks in which the contactors rotate (gal.). The ratio of throughput to contactor area (gal./day/sq. ft.) is called the "hydraulic loading." Two concepts of effectiveness of the equipment are important in this discussion. The primary prior art reference uses the term "efficiency" to denote the percent impurity reduction which a given set-up of the device achieves and we shall so use the term. Appellant uses the term "maximum treatment capacity" to denote when a *unit of contactor area* is providing maximum "efficiency" for a given "throughput" or maximum "throughput" for a given "efficiency." It is essential to understand the distinction between "efficiency," a matter of ultimate effectiveness independent of the efficiency of the equipment, and "treatment capacity," a matter of the efficiency or effectiveness of a unit of contactor area. The latter is more properly associated with the normal use of the term "efficiency" denoting maximum result from a limited resource.

Appellant's claimed device has a ratio of tank volume to contactor area of 0.12 gal./sq. ft. ³ Appellant maintains that this ratio is the most desirable or optimum for all set-ups of the device in the sense that using a lower value gives lower "treatment capacity" and using a greater value gives no increase in "treatment capacity," merely increasing costs. Thus, the value is optimum in that it maximizes "treatment capacity" so that the effectiveness of a given contactor is maximized.

The Prior Art

El-Naggar teaches the basic structure of the device claimed by appellant but is silent regarding quantitative design parameters other than to give data on a single example, which data was apparently complete *except for any discussion of "tank volume."* El-Naggar stated the "efficiency" (obviously referring to the purity of the output) could be increased to 95% by increasing the area of the contactor.

The Rejection

The examiner rejected the claims as obvious under 35 USC 103, noting that the basic device in question is old as taught by El-Naggar. While the ratio of tank volume to contactor area of 0.12 gal./sq. ft. is not disclosed in El-Naggar, the examiner reasoned that the

disclosure of El-Naggar would make a device with that optimum value obvious. The examiner noted that El-Naggar suggests increasing the "efficiency" (degree of purification) of his device by increasing the contactor area while apparently keeping the "throughput" constant, that is, reducing the "hydraulic loading." The examiner then *assumed* that El-Naggar teaches keeping the tank volume constant while increasing the contactor area. Thus, the examiner argued that the idea of increasing tank volume to surface area to increase efficiency is taught and that working out the value for optimum efficiency is mere mechanical experimentation. The board accepted the examiner's reasoning.

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Opinion

[1]In determining whether the invention as a whole would have been obvious under 35 USC 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question (the ratio value) but also to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification. *In re Davies*, 475 F.2d 667, 177 USPQ 381 (CCPA 1973). In this case, the invention as a whole is the ratio value of 0.12 *and* its inherent and disclosed property. That property is that the described devices designed with the ratio will maximize treatment capacity regardless of the values of the other variables in the devices. Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention *as a whole*, and not some part of it, which must be obvious under 35 USC 103. Cf. *In re Papesch*, 50 CCPA 1276, 315 F.2d 381, 137 USPQ 43 (1963).

[2]The controlling question is simply whether the differences (namely the value of 0.12 and its property) between the prior art and appellant's invention as a whole are such that appellant's invention as a whole would have been obvious. The answer is no. It is impossible to recognize, from the experiment taught by El-Naggar, that "treatment capacity" is a function of "tank volume" or the tank volume-to-contactor area ratio. Recognition of this functionality is essential to the obviousness of conducting experiments to determine the value of the "tank volume" ratio which will maximize treatment capacity. Such functionality can *only be determined* from data representing either efficiency at varying tank volume, fixed throughput, and fixed contactor area or throughput at varying tank volume, fixed efficiency, and fixed contactor area. Each of these experiments represents treatment capacity with fixed contactor area but varying tank volume. This sort of experiment would not be suggested by the teachings of El-Naggar since he was not trying to maximize or control "treatment capacity." The experiments suggested by El-Naggar do not reveal the property which applicant has discovered, and the PTO has provided us with no other basis for the obviousness of the necessary experiments.

[3]The PTO and the minority appear to argue that it would always be *obvious* for one of ordinary skill in the art *to try* varying *every* parameter of a system in order to optimize the effectiveness of the system even if there is no evidence in the record that the prior art recognized that particular parameter affected the result.⁴ As we have said many times,

obvious to try is not the standard of 35 USC 103. In re Tomlinson, 53 CCPA 1421, 363 F.2d 928, 150 USPQ 623 (1966). Disregard for the unobviousness of the results of "obvious to try" experiments disregards the "invention as a whole" concept of §103, In re Dien, 54 CCPA 1027, 371 F.2d 886, 152 USPQ 550 (1967) and In re Wiggins, 55 CCPA 1356, 397 F.2d 356, 158 USPQ 199 (1968), and overemphasis on the routine nature of the data gathering required to arrive at appellant's discovery, after its existence became expected, overlooks the last sentence of §103. In re Saether, 492 F.2d 849, 181 USPQ 36 (CCPA 1974).

[4]In In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955), the court set out the rule that the discovery of an optimum value of a variable in a known process is normally obvious. We have found exceptions to this rule in cases where the results of optimizing a variable, which was known to be result effective, were unexpectedly good. In

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re Waymouth, 499 F.2d 1273, 182 USPQ 290 (CCPA 1974); In re Saether, *supra*. This case, in which the parameter optimized was not recognized to be a result-effective variable, is another exception. The decision of the board is reversed.

Footnotes

Footnote 1.

Serial No. 331,796, filed February 12, 1973.

Footnote 2. "Method of Treatment of Sewage by Bio-Oxidation and Apparatus Therefor," U.S. Patent No. 3,335,081, issued August 8, 1967.

Footnote 3. Claims 1 and 2 recite "at least about 0.12" while claim 3 recites "about 0.12."

Footnote 4. The precise nature of the El-Naggar experiment and the nature of the data which would result are rendered hopelessly speculative by El-Naggar's total failure to discuss the critical matter of what is done with the volume of the tank. The PTO appears to assume, as a necessary element of its conclusion, that appellant's ratio is the inevitable result of El-Naggar experiment, and that the tank volume is fixed, apparently because El-Naggar does not suggest changing the tank as additional contactor area is supplied. Even if the same tank were used, the actual liquid volume of the tank could change significantly if 1) the tank has a level control, 2) the tank is not extremely large in comparison to the contactors and 3) the volume-to-area ratio of the contactors themselves is significant. Since these assumptions are not unreasonable, there is serious doubt as to the constant volume of the tank.

Whether one would inevitably arrive at the ratio value of 0.12 or above depends on facts which must be read into El-Naggar, (e.g., the volume of the tank) and on assumptions about the kind of motivation (e.g., the degree of "efficiency" which would be sought). All of this involves, at least on this record, mere speculation. Assuming, as the examiner has, that the tank volume is fixed and the natural motivation is to maximize efficiency, if El-Naggar's equipment has a tank volume to contactor area ratio of less than 0.12, and the resulting

efficiency is found wanting, increasing the contactor area to increase "efficiency" will lead away from the claimed ratio.

Dissenting Opinion Text

Dissent By:

Maletz, Judge, with whom Rich, Judge, joins, dissenting.

With all due respect, I cannot agree with the majority's interpretation of the El-Naggar patent. El-Naggar discloses the same wastewater treatment apparatus as claimed, except for the specific volume-to-surface ratio of .12 gallons per square foot as recited in the claims. However, El-Naggar generally discloses varying the number of disks (column 3, lines 31-35), the number of concentric cylinders (column 4, lines 27-30), or the length of the cylinders (column 4, lines 61-62) in his apparatus in order to optimize results. Given the basic apparatus of El-Naggar and the concept of varying the number of disks in a tank in order to optimize impurity removal, I believe that it would have been well within the capabilities of the chemical engineer of ordinary skill to determine empirically, by routine experimentation, the optimum design ratio which appellant has determined and recited in his claims. That is, El-Naggar set the way, and appellant's work was what any routineer would have accomplished in following the patent teachings.

Appellant urges that the results which he determined empirically by plotting the effect of volume-to-surface ratio on impurity removal, including the specific, optimum design ratio of .12 gallons per square foot, could not have been predicted from El-Naggar. However, obviousness under 35 USC 103 does not require absolute predictability, *In re Kronig*, 539 F.2d 1300, 190 USPQ 425 (CCPA 1976), and it is sufficient here that El-Naggar clearly led the way for the routineer to arrive at the claimed apparatus.

I am in substantial agreement with the board's analysis of this case, and I would affirm the board's decision.

Footnote * Judge of the United States Customs Court sitting by designation pursuant to 28 U.S.C. 293(d).

- End of Case -